

CLAIMS

1. (Currently Amended) A non-aqueous electrolyte secondary battery comprising:

a battery device having a positive electrode having a collector, on which a positive electrode active material layer containing a positive electrode material is formed, a negative electrode, and a non-aqueous electrolyte layer, the battery device being sealed in a film-state packaging member,

wherein concentration in mass ratio of a free acid in the electrolyte layer is 60 ppm and less;

wherein a metal foil laminate case or a laminated film obtained by coating metal foil with a resin and having a structure of packaging resin layer/metal film/sealant layer is used.

2. (Cancelled)

3. (Currently Amended) A non-aqueous electrolyte secondary battery according to claim 1, wherein the positive electrode active material is a composite oxide LiMO_2 (where, M is at least one material selected from Co, Ni, and Mn) made of a lithium and a transition metal.

4. (Original) A non-aqueous electrolyte secondary battery according to claim 3, wherein the composite oxide of a lithium and a transition metal is at least one material selected from LiCoO_2 , $\text{Li}_x\text{Co}_{1-y}\text{Al}_y\text{O}_2$ (where $0.05 \leq x \leq 1.10$ and $0.01 \leq y \leq 0.10$), LiNiO_2 , $\text{LiNi}_y\text{Co}_{1-y}\text{O}_2$ (where $0 < y < 1$), $\text{Li}_x\text{Ni}_y\text{M}_{1-y}\text{O}_2$ (where M denotes at least

one of transition metals, B, Al, Ga, and In, $0.05 \leq x \leq 1.10$ and $0.7 \leq y \leq 1.0$), and LiMn_2O_4 .

5. (Original) A non-aqueous electrolyte secondary battery according to claim 4, wherein the positive electrode active material is LiCoO_2 .

6. (Previously Amended) A non-aqueous electrolyte secondary battery according to claim 1, wherein the electrolyte is made of a lithium salt and a polymer compound, in which the lithium salt is dissolved or mixed, and

one or more polymer compounds selected from one or more polymer compounds selected from the group consisting of ether-based polymers which is poly(ethylene oxide) and a crosslinked of the poly(ethylene oxide), poly(methacrylate) ester polymer, acrylate polymer, and fluorine polymer which is poly(vinylidene fluoride) and poly(vinylidene fluoride-co-hexafluoropropylene).

7. (Original) A non-aqueous electrolyte secondary battery according to claim 1, wherein the electrolyte layer is made of a lithium salt, a non-aqueous solution, and a polymer material, and at least one of LiPF_6 , LiBF_4 , LiAsF_6 , LiClO_4 , LiCF_3SO_3 , $\text{Li}(\text{CF}_3\text{SO}_2)_2\text{N}$, $\text{LiC}_4\text{F}_9\text{SO}_3$, LiCl , and LiBr is mixed as a lithium salt.

8. (Withdrawn) A non-aqueous electrolyte secondary battery comprising: a positive electrode having a positive electrode collector, on which a positive electrode active material layer containing a positive electrode material is formed, a negative electrode having a negative electrode collector, on which a negative electrode active material layer is formed, and a film-state case as a packaging member,

wherein average particle diameter of the positive electrode active material lies in a range from 10 to 22 μm .

9. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 8, wherein the positive electrode active material has minimum particle diameter of 5 μm or larger, maximum particle diameter of 50 μm and less, and specific surface area of 0.25 m^2/g and less.

10. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 8, wherein the packaging member is a laminated film obtained by coating metal foil with a resin, a polymer film, or a metal film.

11. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 8, wherein the positive electrode active material is a lithium-transition metal complex oxide LiMO_2 (where, M is at least one material selected from Co, Ni, and Mn).

12. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 11, wherein the complex oxide of the lithium and the transition metal is at least one material selected from LiCoO_2 , $\text{Li}_x\text{Co}_{1-y}\text{Al}_y\text{O}_2$ (where $0.05 \leq x \leq 1.10$ and $0.01 \leq y \leq 0.10$), LiNiO_2 , $\text{LiNi}_y\text{Co}_{1-y}\text{O}_2$ (where $0 < y < 1$), $\text{LxNiyM}_{1-y}\text{O}_2$ (where M denotes at least one of transition metals, B, Al, Ga, and In, $0.05 \leq x \leq 1.10$ and $0.7 \leq y \leq 1.0$), and LiMn_2O_4 .

13. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 12,

wherein the positive electrode active material is LiCoO_2 .

14. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 8, wherein the electrolyte is made of a lithium salt and a polymer compound, in which the lithium salt is dissolved or mixed, and

one or more polymer compounds selected from ether-based polymers such as poly(ethylene oxide) and a crosslinked of the poly(ethylene oxide), poly(methacrylate) ester polymer, acrylate polymer, and fluorine polymer such as poly(vinylidene fluoride) and poly(vinylidene fluoride-co-hexafluoropropylene) is/are used.

15. (Withdrawn) A non-aqueous electrolyte secondary battery comprising:
a positive electrode having a positive electrode collector, on which a positive electrode active material layer containing a positive electrode material is formed, a negative electrode having a negative electrode collector, on which a negative electrode active material layer is formed, and a film-state case as a packaging member,
wherein the positive electrode active material layer contains 0.15 percent by weight of carbonate compound and less.

16. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 15, wherein moisture contained in the positive electrode active material is 300 ppm and less.

17. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 15, wherein the positive electrode active material is a complex oxide LiMO_2 (where, M is at least one material selected from Co, Ni, and Mn) made of a lithium and a transition metal.

18. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 15, wherein the carbonate contained in the positive electrode active material is LiCoO_3 .

19. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 17, wherein the complex oxide of a lithium and a transition metal is at least one material selected from LiCoO_2 , $\text{Li}_x\text{Co}_{1-y}\text{Al}_y\text{O}_2$ (where $0.05 \leq x \leq 1.10$ and $0.01 \leq y \leq 0.10$), LiNiO_2 , $\text{LiNi}_y\text{Co}_{1-y}\text{O}_2$ (where $0 < y < 1$), $\text{Li}_x\text{Ni}_y\text{M}_{1-y}\text{O}_2$ (where M denotes at least one of a transition metal, B, Al, Ga, and In, $0.05 \leq x \leq 1.10$ and $0.7 \leq y \leq 1.0$), and LiMn_2O_4 .

20. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 15, wherein the positive electrode active material is LiCoO_2 .

21. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 15, wherein the packaging member is a aluminum laminate pack obtained by coating aluminum with a resin.

22. (Withdrawn) A non-aqueous electrolyte secondary battery according to claim 15, wherein the electrolyte is made of a lithium salt and a polymer compound in which the lithium salt is dissolved, and

one or more polymer compounds selected from ether-based polymers such as poly(ethylene oxide) and a crosslinked of the poly(ethylene oxide), poly(methacrylate) ester polymer, acrylate polymer, and fluorine polymer such as poly(vinylidene fluoride) and poly(vinylidene fluoride-co-hexafluoropropylene) is/are used.